

CHELSEA N. PETERS

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EDUCATION

Vanderbilt University

Ph.D. in Environmental Engineering

Dissertation: Freshwater in coupled human-natural systems in Bangladesh

Advisor: George M. Hornberger

Nashville, TN

Aug. 2018

Vanderbilt University

M.Sc. in Environmental Engineering

Advisor: George M. Hornberger

Nashville, TN

May 2016

Rhodes College

B.S. in Chemistry and Environmental Science

Summa Cum Laude and Phi Beta Kappa

Advisors: David Jeter and Rosanna Cappellato

Memphis, TN

May 2012

RESEARCH INTERESTS

Climate change vulnerability in developing countries

Localized and basin-wide groundwater-surface water interactions

Decision-making and knowledge transfer associated with water resources

AWARDS, HONORS, & FELLOWSHIPS

National Science Foundation Travel Grant, funding for AGU Chapman Conference, \$2,000 2019

Vanderbilt University Graduate School Banner Bearer, for “excelling in all aspects of the graduate career” 2019

Public Scholar Fellowship, funding for 1 yrs, \$2,000 2016

Vanderbilt University Graduate School Travel Grant, funding for conference, \$500 2016

NSF Graduate Research Fellowship, funding for 3 yrs, \$96,000 & tuition 2014

IBM Graduate Fellowship, funding for 4 yrs, \$20,000 2013

Cambridge Scholarship, funding for 4 yrs, \$124,000 2008

PUBLICATIONS

Peters, C. N., H. A. Michael (2021), Well Location Influence on Seawater Intrusion in Coastal Aquifers, Groundwater, in prep.

Peters, C. N., C. Kimsal, R. Frederiks, A. Paldor, R. McQuiggan, H. A. Michael (2021), Savannah River salinization from pumping-induced streamflow depletion, Journal of Hydrology, in prep.

Peters, C. N., G. M. Hornberger (2019), A Search for Freshwater in the Saline Aquifer of Coastal Bangladesh, Groundwater, doi:10.1111/gwat.12937.

Peters, C. N., H. Baroud, G. M. Hornberger (2019), Multicriteria Decision Analysis of Drinking Water Source Selection in Southwestern Bangladesh, Journal of Water Resources Planning and Management, 145, 05019004, doi:10.1061/(ASCE)WR.1943-5452.0001029.

Peters, C. N. (2018), “Health Implications of Watershed Management” and “Water Pollution,” in Environmental Health in the 21st Century: From Air Pollution to Zoonotic Diseases. Edited by Richard Crume. 2 vols. Santa Barbara, CA: ABC-CLIO.

Peters, C. N., R. Bennartz, and G. M. Hornberger (2017), Satellite-derived methane emissions from inundation in Bangladesh, Journal of Geophysical Research Biogeosciences, 122, 1137–1155, doi:10.1002/2016JG003740.

Peters, C. N. (2017), Farzana’s Journey: A Bangladesh Story of the Water, Land, and People. (n.p): Author.

TEACHING EXPERIENCE

Roanoke College—Environmental Studies

Salem, VA

Assistant Professor

Aug. 2020 - Present

- Instructor of ENSC 361 Water and Society, ENSC 101 (plus lab) Environmental Science, and ENSC 270 Geographic Information Systems.
- Mentor 4 undergraduate research students, each conducting independent projects.
- Co-develop the Roanoke College Environment Center for hands-on, place-based environmental education.

University of Delaware—Earth Sciences

Newark, DE

Instructor of Record

Feb. 2020 – Aug. 2020

- Instructed undergraduate research for course credit.
- Directed 6 hours/week of data analysis and taught data QA/QC procedures, documentation, and scientific writing.
- Led paper discussions, lab meetings, and the preparation and presentation of a final scientific report.

University of Delaware—Earth Sciences

Newark, DE

Guest Lecturer

Aug. 2019 – Aug. 2020

- Lectured for 300-student World Geography course on geology, water, and climate in South Asia.

Vanderbilt University—Earth & Environmental Sciences

Nashville, TN

Lecturer and Lab Instructor

Aug. 2018 – Dec. 2018

- Taught two undergraduate labs for Dynamic Earth and Oceanography for 13 students and served as head lab instructor over four graduate teaching assistants.
- Developed, prepared, and presented hands-on lab activities and led four field trips.
- Planned and lectured on hydrology and natural resources for 100+ student introductory class.
- Created geoscience course content for Vanderbilt and Tennessee State University NSF GEOPATH program.

Programs for Talented Youth

Nashville, TN

Instructor for Summer Academy for Vanderbilt Youth

Jan. 2016 - Oct. 2018

- Developed, taught, and assessed week-long Hydrology and Geology courses for K-6th grade gifted students.
- Practice relevant pedagogical methods (e.g. think-pair-share, concept maps, reflection, and team-based learning) for advanced students.
- Achieved above-average teaching evaluations from students and parents as well as superior rankings for course concept and design.

Vanderbilt University—Civil & Environmental Engineering

Nashville, TN

Graduate Teaching Assistant

Aug. 2013 - May 2014

- Lecture for an undergraduate Introduction to Environmental Engineering course and a graduate Environmental Characterization and Analysis course.
- Completed all course assessment and grading for 50+ students.

AmeriCorps

Knoxville, TN

Water Quality Team Member

Aug. 2012 - Jun. 2013

- Created and taught Adopt-A-Watershed program, including labs and service activities, in two middle and four high schools, working with over 1,500 students in 69 different classes.

- Organized environmental events, such as Adopt-A-Stream, Families in the Creek, Waterfest, and EarthFest.

Rhodes College—Chemistry

Lab Assistant

Memphis, TN

Aug. 2010 - May 2012

- Set up and supervised labs for Chemistry-and-Archeology and Chemistry-and-Art courses.
- Assisted students with hands-on activities, lab protocols, and make-up assignments.

RESEARCH EXPERIENCE

Roanoke College—Environmental Studies

Assistant Professor

Salem, VA

Aug. 2020 - Present

- Develop groundwater models for collaborative economic behavioral experiments to assess water use behavior in vulnerable coastal regions.
- Assess on-campus stormwater remediation opportunities and lead effort to implement novel suburban wetland restoration designs.
- Identify and characterized groundwater discharge to Roanoke Valley stream through thermal signatures and water quality variations.
- Demonstrate groundwater pumping impacts on coastal stream salinity in Savannah, GA and other sites of interest along the U.S. mid-Atlantic coast.

University of Delaware—Earth Sciences

Postdoctoral Researcher

Newark, DE

Mar. 2019 – Aug. 2020

- Quantified vulnerability of coastal groundwater resources due to over extraction, climate change, and the resulting contamination by saltwater intrusion.
- Built sets of numerical hydrogeological models to simulate groundwater salinization due to competing water uses in heterogeneous aquifers.
- Developed new method to couple economic behavioral experiments with physics-based hydrogeologic models in order to observe feedbacks between human-natural systems.
- Collaborated with cross-disciplinary teams and stakeholders (i.e. farmers, government agencies) to identify sustainable water use policies.

Vanderbilt University—Earth & Environmental Sciences

Postdoctoral Researcher

Nashville, TN

Aug. 2018 – Mar. 2019

- Explored groundwater-surface water interactions in southwestern Bangladesh using well and tidal gauge data as well as electromagnetic induction surveys.

Vanderbilt University—Civil & Environmental Engineering

Graduate Researcher

Nashville, TN

Aug. 2013 - Aug. 2018

- Researched sustainable drinking water resources in southwestern Bangladesh by planning, executing, and maintaining a network of groundwater wells during international field expeditions.
- Analyzed time series data and statistically deduced that groundwater-surface water interactions were limited due to a clay subsurface layer.
- Modeled evolution of groundwater chemistry and determined mobilization pathways of arsenic and salt.
- Interviewed local water users, NGOs, and academic stakeholders about drinking water sources and synthesized suggestions for sustainable solutions in rural Bangladesh using advanced decision analysis.
- Determined extent of CH₄ emissions from seasonally flooded areas in South Asia and published a new method to determine country-wide emissions using satellite observations.

Cumberland River Compact

Stream Restoration Researcher

Nashville, TN

Jun. 2015 - Aug. 2015

- Created a Watershed Based Plan for Mansker's Creek using BASINS model based on pollution loads.
- Researched land ownership data and built a database of property owners along creek.
- Contributed to non-profit's draft 319 Grant proposal for future stream restoration activities.

Knox County Stormwater

AmeriCorps Volunteer

Knoxville, TN

Aug. 2012 - Jun. 2013

- Implemented programs designed to bring the municipality under compliance with its NPDES permit, including 80 miles of stream corridor assessment, stormwater BMP installment, and stream restoration.
- Aided Tennessee Department of Environment and Conservation with regional biological field assessments.

Rhodes College

Student Researcher

Memphis, TN

Aug. 2011 - May. 2012

- Analyzed soil lead concentrations at a public park near Valero Refinery to find lower concentrations than previously reported, suggesting erosion/deposition along Mississippi River floodplain.

Memphis Zoo

Conservation Intern

Memphis, TN

Aug. 2010 - May. 2012

- Conducted noninvasive research on Snow Leopard reproductive physiology.
- Perform sample preparation and enzyme immunoassay eventually published in Theriogenology academic journal.
- Coached 5+ interns through lab protocol and prepared weekly schedules.

CONFERENCE PROCEEDINGS & PUBLISHED ABSTRACTS

Peters, C. N., H. A. Michael (Dec. 2020), Well Location Influence on Seawater Intrusion in Coastal Aquifers. **Poster.** AGU Fall Meeting, Virtual.

Peters, C. N. (Feb. 2020), Groundwater pumping and salinization risks in coastal aquifers. Geological Society of Washington, Washington, D.C.

Peters, C. N., H. A. Michael, F. Ahsanuzzaman, M. Hingst, and L. Palm-Forster (Dec. 2019), Feedbacks Between Groundwater Pumping Decisions and Salinization Risks in Coastal Aquifers. AGU Fall Meeting, San Francisco, CA.

Peters, C. N. and H. A. Michael (Oct. 2019), Behavioral Responses to Spatially-Variable Salinization Risks in Vulnerable Coastal Aquifers. AGU Chapman Conference on the Quest for Sustainability of Heavily Stressed Aquifers at Regional to Global Scales, Valencia, Spain.

Hingst, M., **C. N. Peters,** and H. A. Michael (Oct. 2019), Impacts of Competing Water Demands on Saltwater Intrusion near Dover, DE. **Poster.** UMD College of Ag and Natural Resources Conference on Chesapeake Bay Health. College Park, MD.

Peters, C. N. and G. M. Hornberger (Dec. 2017), A Search for Freshwater in the Saline Aquifers of Coastal Bangladesh. AGU Fall Meeting, New Orleans, LA.

Peters, C. N., M. Machado, and G. M. Hornberger (Dec. 2017), Farzana's Journey: A Children's Book for Research-based, Educational Outreach in Remote Communities of Bangladesh. **Poster.** AGU Fall Meeting, New Orleans, LA.

Peters, C. N., H. Baroud, and G. M. Hornberger (May 2017), Multicriteria decision analysis of freshwater resource management in Southwestern Bangladesh. **Poster.** Community Surface Dynamics Modeling System Annual Meeting, Boulder, CO.

Peters, C. N., H. Baroud, and G. M. Hornberger (Sep. 2016), Multicriteria decision analysis of freshwater resource management in SW Bangladesh. 43rd International Association of Hydrogeologist Congress, Montpellier, France.

Peters, C. N. and G. M. Hornberger (Jul. 2016), Groundwater-Surface Water Interactions in the Poldered Landscape of Southwest Bangladesh. 24th Salt Water Intrusion and 4th Asia-Pacific Coastal Aquifer Management Meeting, Cairns, Queensland, Australia.

Peters, C. N., R. Bennartz, and G. M. Hornberger (Dec. 2015), Methane Emissions from Bangladesh: Bridging the Gap Between Ground-based and Space-borne Estimates. **Poster.** AGU Fall Meeting, San Francisco, CA.

Peters, C. N., J. C. Ayers, and G. M. Hornberger (Sep. 2015), Evolution of Saline and Arsenic Contaminated Groundwater in Southwest Bangladesh. **Poster.** GSA Annual Meeting, Baltimore, MA.

Peters, C. N. and G. M. Hornberger (Dec. 2014), Groundwater-Surface Water Interactions in the Poldered Landscape of Southwest Bangladesh. **Poster.** AGU Fall Meeting, San Francisco, CA.

SYNERGISTIC ACTIVITIES

Well Beyond Technical Team

Hydrogeologist

Austin, TX

Jan. 2020 – Present

- Work to provide impactful, sustainable, clean water to communities in developing countries through client partnerships.
- Coordinate with field team to design, install, or rehabilitate water well and rainwater collection systems.

AGU Fall Meeting Planning Committee

Science and Society (SAS) Section Representative

Newark, DE

Jan. 2020 – Present

- Review proposed session abstracts for SAS and assist session organizers in planning.
- Coordinate with AGU to schedule and create AGU Fall Meeting program.

Eastern Kent County Working Group

Member

Dover, DE

Nov. 2019 – Present

- Strategize with regional stakeholders (e.g. farmers, city managers, state regulators) to increase stakeholder collaboration and work toward sustainable water management in Kent County.
- Serve as research lead and groundwater expert by sharing field and model findings, quantifying current water resource vulnerability, and predicting risks of increased water use and sea level rise.

Graduate Research and Education Advisory Board

Founding Board Member

Nashville, TN

Apr. 2019 – Present

- Advise and support the Vanderbilt University Graduate School by reviewing the School's strategic plan.
- Meet biannual with appointed board members to discuss and report on graduate education and research initiatives related to the success of VU students, such as mental health, leadership training, and funding opportunities.

Hydrogeology Research Group

Mentor

Newark, DE

Apr. 2019 - Present

- Provide guidance on research objectives, field and analytical techniques, and writing.
- Lead paper discussions and provide feedback on student presentations.
- Facilitate professional development activities and give counsel on career paths.

Association for Women Geoscientists

Outstanding Educator Award Committee Member

Newark, DE

Jul. 2019 - Present

- Review nominations and select winner of prestigious teaching award.

Various Peer-Reviewed Journals

Anonymous Reviewer

Newark, DE

Aug. 2017 - Present

- Serve as reviewer for academic journals, such as *Hydrology and Earth System Sciences*, *Remote Sensing of Environment*, and *Science of the Total Environment*.

Vanderbilt University Graduate Student Council

Student Life Liaison

Nashville, TN

Jun. 2017 - Aug. 2018

- Consult with students to bring concerns to university administration and advocate for change.
- Mediate and facilitate dialogue for multi-party disputes and complex student life conflicts, while also serving as a confidential resource for students with policy concerns.

- Compose thorough, impartial, and factual public resources on important and nuanced topics, such as mental health, holistic admission, mentorship, and unionization of graduate students.
- Chaired multiple committees on diversity and inclusion, mental health, and mentorship and grievances that created university documents highlight by Nature.

The Curb Center for Art, Enterprise, & Public Policy

Public Scholar in Science Communication

Nashville, TN

Jan. 2016 - Oct. 2017

- Wrote, illustrated, published, and distributed 600 copies of an environmental science children's book to Bangladeshi schools to teach science and natural history in low-resources regions.
- Hired and supervised 7 illustrators and graphic artists and wrote a \$10,000 proposal, funding 100% of project.
- Translated research findings into publicly available resources increasing access to scientific knowledge.

Civil and Environmental Engineering Council

President

Nashville, TN

2014 - May 2017

- Facilitated communication between department students and faculty members.
- Advocated for stipend equity leading to stipend increases for graduate students across engineering.

Vollintine Evergreen Community Association

Environmental Fellow

Memphis, TN

Apr. 2011 - May 2012

- Interviewed community members about neighborhood needs and desired improvements.
- Planned neighborhood environmental events, initiated community fundraisers, and developed environmental spaces, including building and maintenance of community gardens.

PROFESSIONAL DEVELOPMENT & SHORT COURSES

Project Management

Project Management Professional (PMP)

Nashville, TN

Apr. 2018 – Aug. 2019

- Develop and practice technical project management, budgeting, leadership, and interpersonal skills applicable to research and teaching careers.
- Achieve above-target passing score on Project Management Institute's PMP exam (40-50% passing rate for practicing professionals).
- Fulfill educational requirements for the credential through 4-course framework through U. of California, Irvine while simultaneously working fulltime.

STEM Policy & Advocacy: Making Your Voice Heard!

Graduate Short Course

Nashville, TN

Nov. 2017

- Workshop for understanding the history of federal funding for university research, developing practical communication strategies to engage policymakers about STEM research, and engaging with the public through social media.

Summer Institute for Earth Surface Dynamics

Graduate Short Course

Minnesota, MN

Aug. 2017

- Investigated scale in earth-surface systems to better inform predictions.

Vanderbilt University Center for Teaching

Graduate Short Course

Nashville, TN

Jul. 2016 - Dec. 2016

- Recipient of Certificate in College Teaching Course

Alaska Wildlands Studies

Undergraduate Field Course

Wrangell-St. Elias, AK

Jun. 2014 - Aug. 2014

- Explore fundamental aspects of landscape evolution and species adaptation due to climate change in SE Alaska.

SKILLS

Technical ArcGIS, LaTeX, MODFLOW, SEAWAT, FloPy, BASINS, Geochemical Workbench, git, Inkscape, Adobe Illustrator, Excel

Field Cond/temp/depth data loggers, well installation, geophysical surveying, GEM2, hydrolab, borehole gamma, GPS

Programming Python, MATLAB, R, IDL

Languages English, Spanish (novice, written and oral comprehension)

PROFESSIONAL AFFILIATIONS

National Association of Geoscience Teachers (NAGT)

Society of Women in Marine Science (SWM)

Geological Society of America (GSA)

Community Surface Dynamics Modeling Systems (CSDMS)

American Geophysical Union (AGU)

International Association of Hydrogeologists (IAH)

Association for Environmental Studies and Sciences (AESS)